

CORPS OF ENGINEERS  
NATIONAL DAM INSPECTION PROGRAM  
BOSTON AREA - MASSACHUSETTS COASTAL BASIN

SLUICE POND DAM

MA 00236

DELETED FROM PROGRAM  
(LOW HAZARD POTENTIAL)

HAYDEN, HARDING & BUCHANAN, INC.  
BOSTON, MASSACHUSETTS  
CONTRACT NO. DACW 33-80-C-0006

## SLUICE POND DAM

Identification No.: MA 00236  
Stream: Tributary to Saugus River  
City: Lynn  
County and State: Essex County, Massachusetts

Sluice Pond Dam was built about 1900. It is a stone masonry earth fill dam about 10 feet high by 130+ feet long. It appears that the original dam did not have a spillway. Water was discharged through a 24+ inch outlet pipe, to a mill building. It then flowed into a stream to Flax Pond. Additional construction has taken place which has significantly altered the original dam. The 24 inch line has been sealed. The existing intake structure has a screened inlet, a 22 inch overflow pipe and a gatehouse with control gate. To the left of the intake structure is a 30 inch intake pipe having a gate in a manhole located at the crest. Outflow from the intake structure and 30 inch pipe flow into the city drain system to Flax Pond, along a baseball field. The level of the roadway (Broadway) was raised and the roadway embankment has been extended to a width which varies from 70 to 85 feet across the top. The bottom width, at the location of the "old stream channel" is at least 145 feet. The present dam can only be seen from the upstream pond side. The downstream area has been replaced by the roadway.

According to Corps Guidelines, the dam has a small size classification and low hazard potential. Failure analysis was

performed assuming the pond was filled to the top of roadway at the time of failure. The maximum failure discharge is 4,100 cfs. This assumes that 52+ feet of the dam and roadway embankment fails. This water will flow overland towards Flax Pond, through the field area shown in the enclosed photographs. All residential homes and other habitable structures are above the failure flood stage.

The changes which have occurred at this site over the years, as previously mentioned, have created a dam which is extremely wide in relation to its height, and one with a very flat downstream slope. As such a "dam type" failure, as analyzed above, is not likely to occur. Hazard potential is low.

6769 (1:50,000)  
(READING)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF LAND AND NATURAL RESOURCES

71° 00' 36.000m E 37 SOUTH LYNNFIELD 14 MI. 57' 30" 340





JOB NO. 79.206  
DATE 11-19-79  
BY MA  
CH'D BY FDD



HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON — WEST HARTFORD

SHEET NO. \_\_\_\_\_  
JOB DAMS  
SUBJECT SLUICE POND  
CLIENT COE

Built prior to 1917 (inspection report  
Height  $\approx 9' \pm$  (1917) 1930 $\pm$  may have  
increased height by 18"

1928 $\pm$  30" drain connected to pond.

Drainage Area: 1.79 s.m. (1146 $\pm$  a.)

Pond Area  $\approx 31$  a.

Present wtr level usually 6'  $\pm$   
below top of dam.

Storage Capacity = 322 $\pm$  a.-f.

Size Class = Small.

Hazard Class = Low

TEST FLOOD = 50 to 100 yr. range

USE 100 yr.

INFLOW =  $1.79 \times 3000 \frac{\text{cf}_3}{\text{sm}} \times \frac{1}{4} = 1350 \text{ cf}_3$

Outflow = 1133 cf<sub>3</sub> 2' deep  
across roadway - assumes  
res. full to elev 173 at start  
of inflow

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 CLIENT COT

## TEST FLOOD

Inflow = 1350. cfs

Assume wtr elev = 67. at beginning of inflow

Storage capacity = 198 a-f to top of dam, between elevs. 67 to 73.

Outlet pipe (30"  $\phi$ ) is of little significance.

100 yr storm  $\approx$  4.75" runoff

Total runoff =  $4.75 \times 1146 \times \frac{1}{12} = 454$  a-f  
 $454 > 198$  a-f roadway will be over topped

Roadway Discharge  $Q = CLH^{1.5}$

<u>D</u>	<u>C</u>	<u>L</u>	<u>H<sup>1.5</sup></u>	<u>Q</u>
1	2.65	150	1	400
2	"	"	2.83	1124
2.5	"	"	3.95	1571

Assume res. full to elev 73 $\pm$  to determine outflow.

$Q_{P1} = 1350$   $E1_1 = 2.25'$   $S1_2 = 103$  a-f = 1.08"

$Q_{P2} = 1350 \left(1 - \frac{1.08}{4.75}\right) = 1043$  cfs  $E1_2 = 1.9'$   $S1_2 = 73$  a-f = 0.76"

$Q_{P3} = 1350 \left(1 - \frac{0.76}{4.75}\right) = 1133$  cfs  $E1_3 = 2'$

ELEV  $\approx$  175.

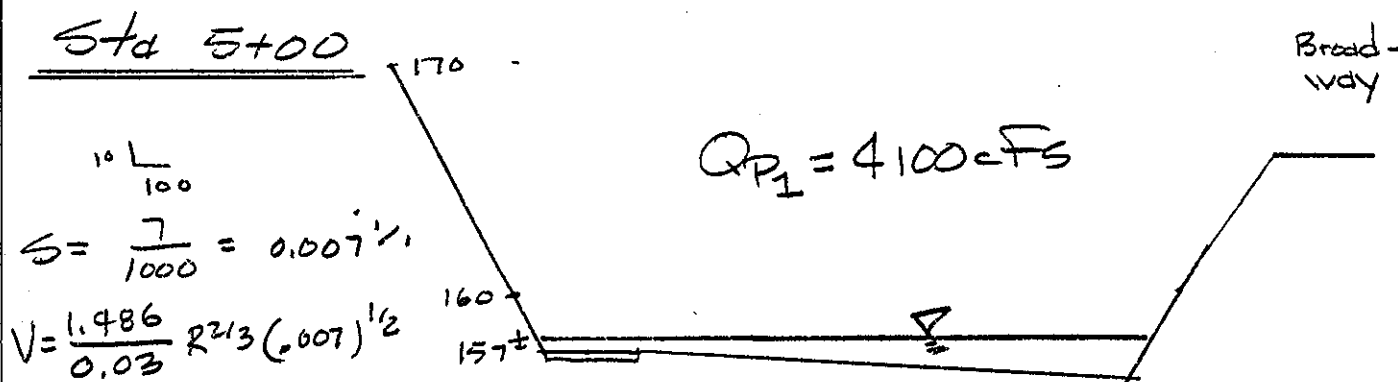
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 DATE 11-19-20  
 BY MA  
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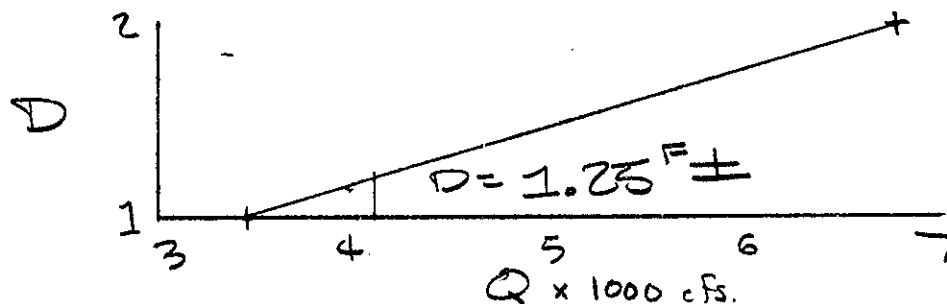
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 JOB DAMS  
 SUBJECT SLUICE POND  
 CLIENT COE

# Failure Outflow



D	WP	A	$R^{2/3}$	F'	V	Q
3	340	1210	2.34	4.14	9.69	11,726
2	340	870	1.88	"	7.77	6,760
1	310	560	1.486	"	6.15	3445



$$Q_{P1} = 4,100; \text{ cfs} \quad E1_1 = 1.25 \cdot \text{Stor}_1 = 8 \text{ c-f}$$

$$Q_{P2} = 4100 \left(1 - \frac{8}{322}\right) = 3997 \pm \text{ cfs}$$

$$E1_2 = 1.20 \quad \text{Stor}_2 = 7 \quad \text{Stor}_e = 7.5$$

$$Q_{P3} = 4100 \left(1 - \frac{7.5}{322}\right) = 4,005 \pm \text{ cfs}$$

$$E1 = 158.25 \pm$$

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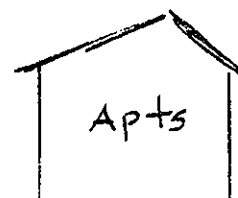
SHEET NO. \_\_\_\_\_  
 JOB DAMS  
 SUBJECT SLUICE POND  
 CLIENT CUE

Sta. 10+00

$S = 0.007 \frac{1}{1}$

$Q_{P_1} = 4005 \text{ cfs}$

Field



155

$V = R^{2/3} (4.14).$

D	WP	A	$R^{2/3}$	$F'$	V	Q
---	----	---	-----------	------	---	---

1	300	300	1	4.14	4.14	1242
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2	304	600	1.58	"	6.53	3917
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2.25	305	675	1.70	"	7.05	4758
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$Q_{P_1} = 4005 \quad E_{l_1} = 2.1' \pm \quad \Delta t_1 = 7.23' \text{ d-f}$

$Q_{P_2} = 4005 \left(1 - \frac{7.23}{322}\right) = 3915$

$E_{l_2} = 2' \quad \Delta t_2 = 6.89 \quad \text{Stave} = 7.06$

$Q_{P_3} = 4005 \left(1 - \frac{7.06}{322}\right) = 3917 \pm \text{ cfs}$

$E_l = 157. \pm$

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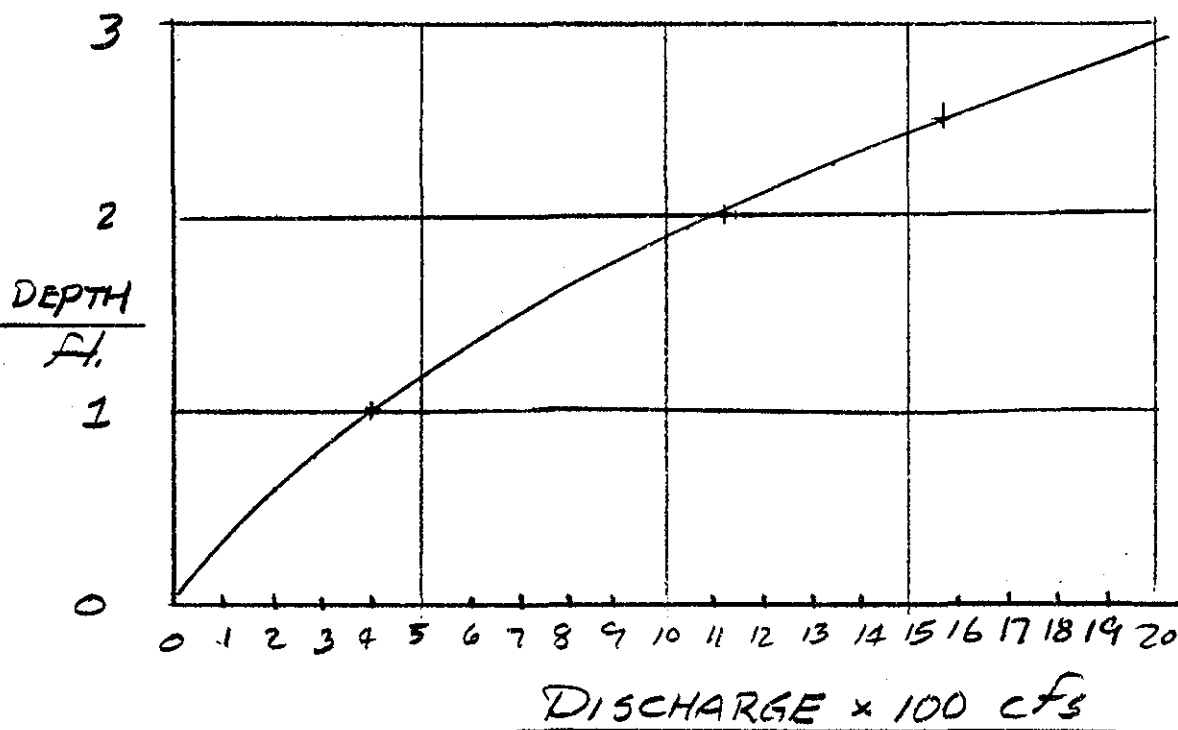
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BOSTON — WEST HARTFORD

SHEET NO. \_\_\_\_\_

JOB DAMS  
SUBJECT SLUICE POND  
CLIENT COE

## STAGE DISCHARGE

Roadway Only



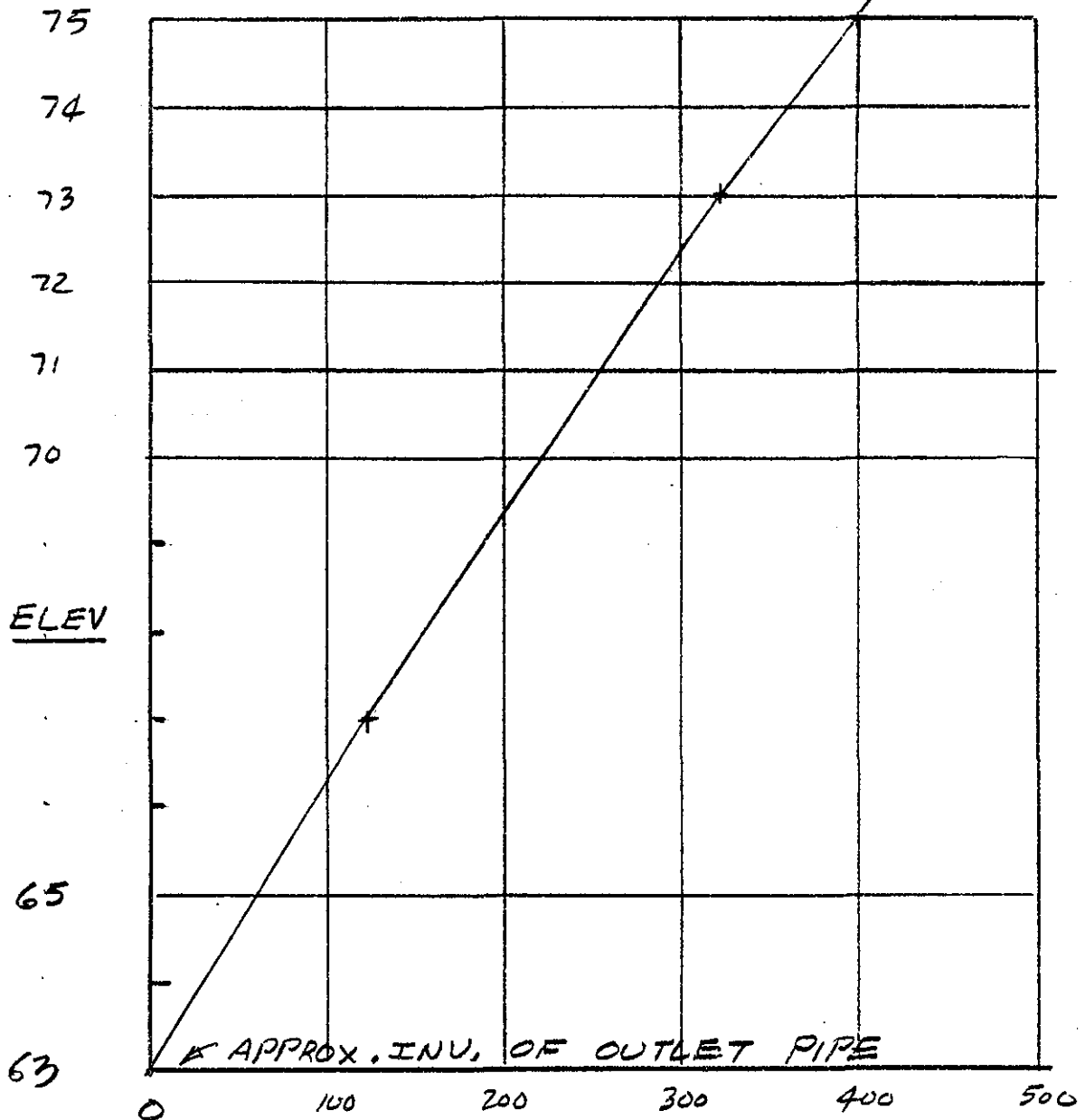
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## STAGE STORAGE

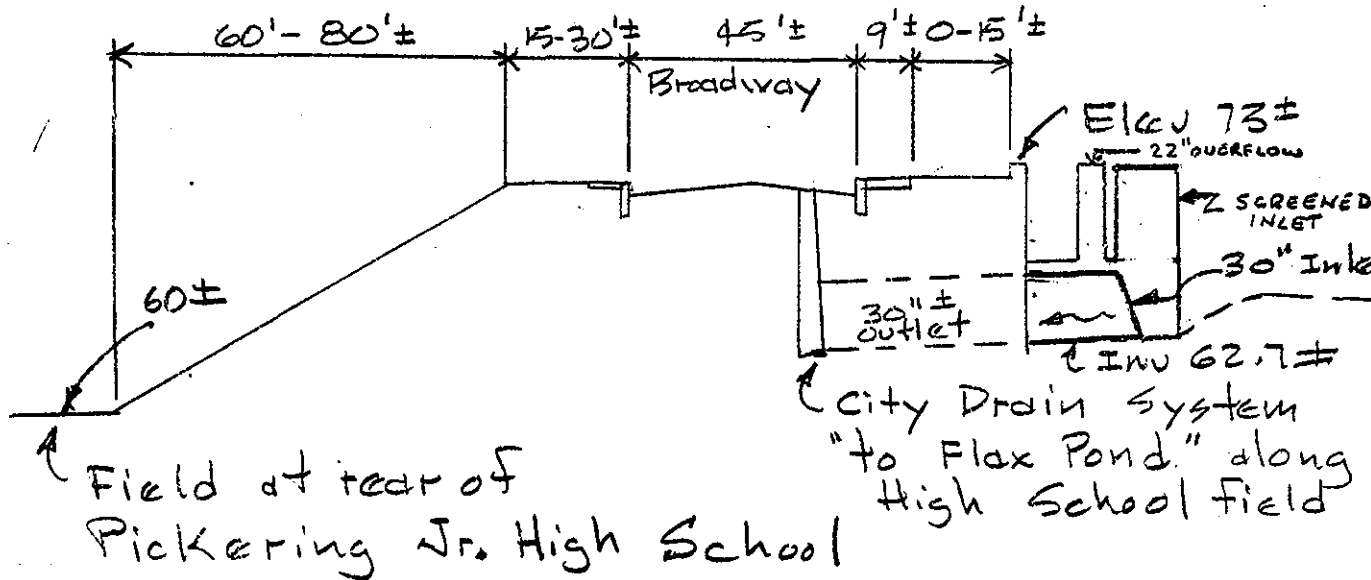


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 SUBJECT SLUICE PND  
 CLIENT CUE



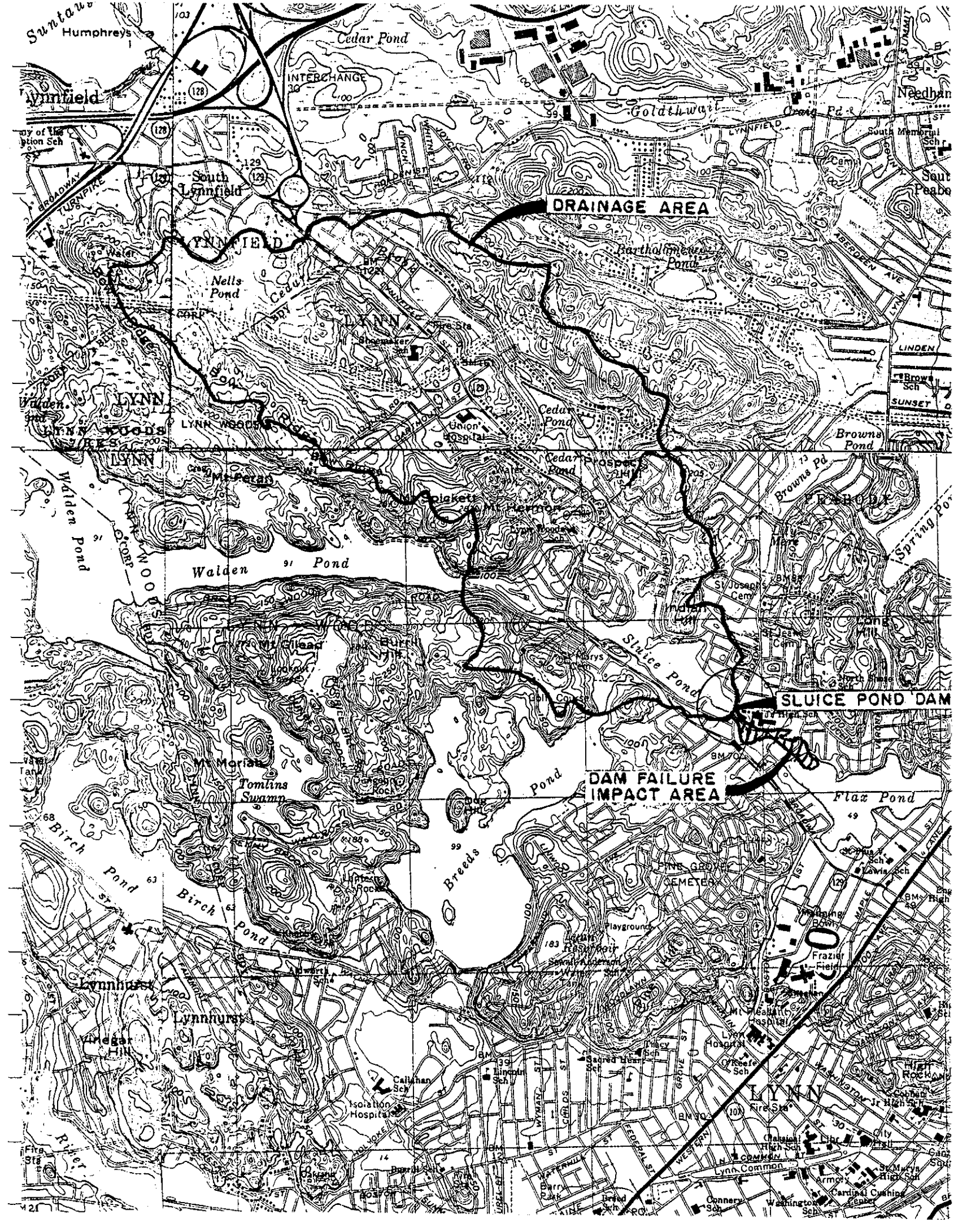
### Storage Capacity

<u>Elev</u>	<u>Area</u>	<u>A<sub>ave</sub></u>	<u>D</u>	<u>Stor</u>	<u>Accum Stor</u>
73	35	33	6	198	322
67	31	31	4	124	124
63	31				

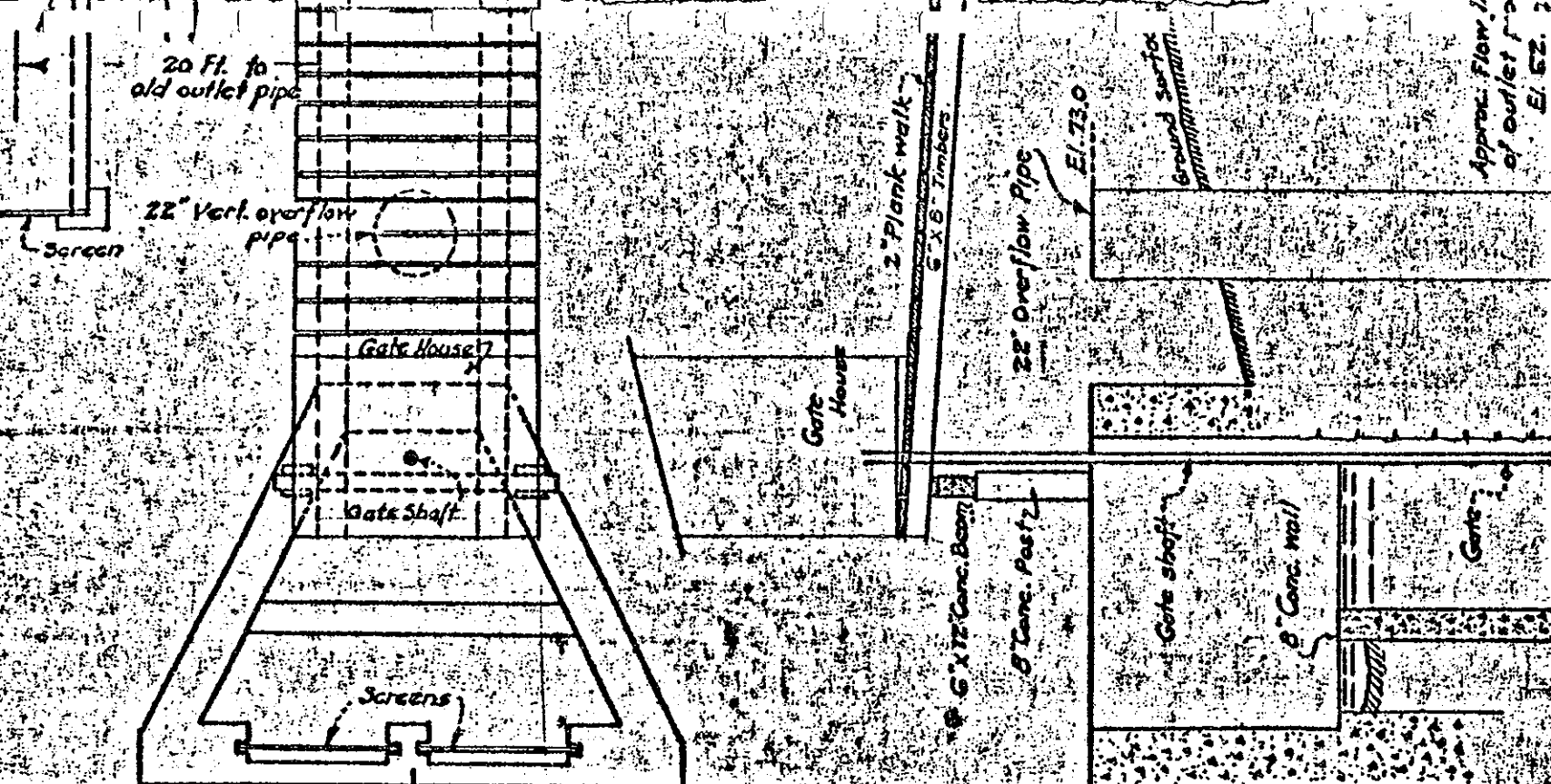
### Failure Outflow

$$Q_F = \frac{8}{27} \times (0.4 \times 130) \times \sqrt{32.2} \times (13')^{1.5}$$

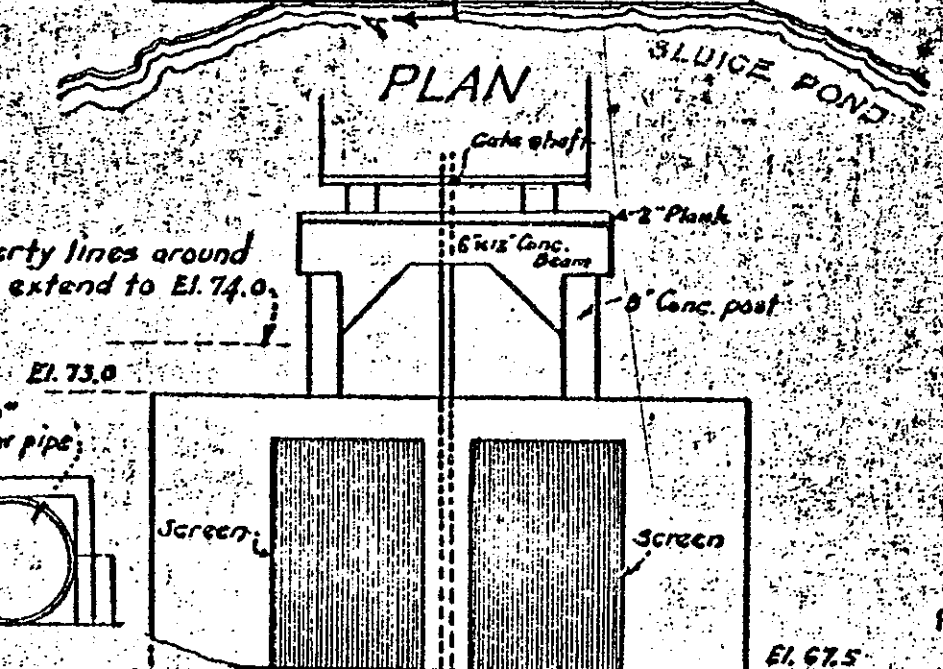
$$Q_F \approx 4100 \text{ cfs}$$







SECTION A-A



PLAN OF  
SLUICE POND DAM (D2)  
AT  
BROADWAY  
IN THE CITY OF  
LYNN

REPAIRS MADE BY MASSACHUSETTS  
FISH AND GAME DEPARTMENT  
1949. Scale 1" = 4'

NOTE: Information as to elevations etc. obtained from Mr. Estabrook, a resident at the pond.  
Sept. 11, 1950 SWW

COUNTY OF ESSEX  
ENGINEER'S OFFICE





PHOTO NO. 1 - Shows the upstream face of the Sluice Pond Dam embankment. The inlet works can be seen in the center center of the photo. The screened inlet and gate house were constructed about 1949. To the left of the gate house is an inlet structure for a 30 inch outlet pipe. Both outlets are connected to the storm drain in the street (Broadway) which forms the embankment. This underground drain flows along side the church, school, ball field and apartments (See Photos Nos. 2, 3 & 4) and then into Flax Pond, about 1500 ft. downstream.





PHOTO NO. 2 - Shows the Dam embankment looking along Broadway. The original Dam was about 10 ft. high at this location. It has been modified by the roadway. The height on the upstream face is about 6 ft. The width and length of the roadway are about 78 and 130 ft., respectively.



PHOTO NO. 3 - Shows the immediate downstream area, at the Dam. The lowest areas (at the center of the photo) shows a parking area, part of the play field and the apartments. Beyond the apartments, a section of Flax Pond can be seen. The apartments were constructed upon a fill which is very level and extends up onto Flax Pond and about 4 ft. high.





PHOTO NO. 4 - Shows the downstream area of the Dam embankment formed by the roadway fill. This is the parking area noted in Photo No. 3. The embankment height is about 10 ft. The play field area beyond, is very flat and wide. It extends to Flax Pond. All other development around the play field is at higher elevations.



PHOTO NO. 5 - Shows the relationship of the wide, flat field to the developed areas around it. Flax Pond can be seen to the right center of the photo. The first floor level of the apartments is about 4 ft. above the field level.





PHOTO NO. 6 - Shows the apartments and field area as seen from the roadway adjacent to Flax Pond. The Sluice Pond Dam outlet pipe and street drain is buried near the fence. This area has been filled.

NEDED-E

31 July 1981

Mr. Anthony D. Cortese, Commissioner  
Department of Environmental Quality  
Engineering  
Commonwealth of Massachusetts  
100 Cambridge Street  
Boston, Massachusetts 02202

Dear Commissioner Cortese:

Inclosed for your use is a copy of the Report on Sluice Pond Dam (MA-00236). During the field inspection and the early stages of the preparation of this report, our contractor found that this dam had a "low potential hazard" for downstream damage in the event of a failure. Based on this finding, we directed our contractor to terminate his work and summarize the work accomplished to date. The report inclosed is a copy of this summary.

Sincerely,

Incl  
As stated

JOE B. FRYAR  
Chief, Engineering Division

CF: Mr. Gould ✓  
Eng Div Files

NEDED-E

31 July 1981

City of Lynn  
City Hall  
Lynn, MA 01901

Gentlemen:

Inclosed for your use is a copy of the Report on Sluice Pond Dam (MA-00236). During the field inspection and the early stages of the preparation of this report, our contractor found that this dam had a "low potential hazard" for downstream damage in the event of a failure. Based on this finding, we directed our contractor to terminate his work and summarize the work accomplished to date. The report inclosed is a copy of this summary.

If you have any questions concerning this report, we suggest you contact the Commonwealth of Massachusetts, Department of Environmental Quality Engineering first; then if there are further questions contact Mr. Gould, Project Management Branch, Engineering Division of this office at (617) 894-2400, extension 313.

Sincerely,

Incl  
as stated

JOE B. FRYAR  
Chief, Engineering Division

CF: Mr. Gould ✓  
Eng Div Files